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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,201	12/01/2003	Chi-Wen Liu	0941-0872P	8748

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EXAMINER

PHAM, THANHHA S

ART UNIT PAPER NUMBER

2813

DATE MAILED: 05/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/724,201

Applicant(s)

LIU ET AL.

Examiner

Thanhha Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04/26/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to Applicant's Amendment dated 04/26/2006.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al [US 2004/0067640] in view of Misra et al [US 6,461,225].

► With respect to claim 15, Hsu et al (figs 1's-2, text [0001]-[0033]) discloses the a CMP rework method comprising steps of:

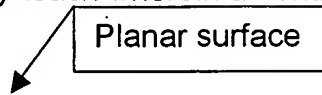
providing a semiconductor substrate which has a patterned dielectric layer (16A/18B/16B, fig. 1C, text [0023]-[0027]), a barrier layer (24A) over the patterned dielectric layer, and a conductive layer (28A) over the barrier layer;

performing a first CMP process to remove part of the conductive layer (figs. 1C-1D, text [0028]);

depositing a layer of material (28B, fig 1E, text [0030]) substantially the same as the conductive layer over the conductive layer (see figure 1E below; and

performing a second CMP process to expose the patterned dielectric layer (fig 1E-1F, text [0031]).

Hsu et al does not expressly teach wherein an entire upper surface of the layer of material is planar.



However, the claimed shape of planar surface of the entire upper surface of the layer of material was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the planar surface of the entire upper surface of the layer of material would yield unexpected result. See *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) (The court held that the configuration of the claimed disposable plastic nursing container was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant.).

In addition, Misra et al (figs 3D-3F, cols 1-5) teaches using the layer of material (40/44) substantially the same as the conductive layer (38) over the conductive layer (38) wherein the entire upper surface of the layer of material (40/44) is planar for performing a CMP process with reduced dishing problem. Therefore, at the time of invention, it would have been obvious for those skilled in the art to modify process of Hsu et al by using the layer of material with the entire upper surface being planar as being claimed, per taught by Misra et al, to reduce problem of dishing in CMP process.

- ▶ With respect to claim 16, Hsu et al (text [0023]-[0027]) discloses the conductive layer comprises copper or copper alloy.
- ▶ With respect to claim 17, Hsu et al (text [0023]-[0027]) discloses the dielectric layer (16A/18B/16B) comprises silicon dioxide, silicon nitride, phosphosilicate glass, borophosphosilicate glass, or fluorosilicate glass.
- ▶ With respect to claim 18, Hsu et al (text [0023]-[0027]) discloses the barrier layer

(24A) comprises Ta, Ti, TaN, TiN, or WN.

- ▶ With respect to claim 19, Hsu et al (text [0023]-[0027]) discloses the deposition of copper or copper alloy is performed using electroplating, CVD, or PVD.
- ▶ With respect to claim 20, Hsu et al (fig 1E) discloses the top surface of the layer (28B) deposited in the step of depositing a layer of material substantially the same as the conductive layer over the conductive layer higher than the barrier layer (24A).

2. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al [US 2004/0067640] in view of Misra et al [US 6,461,225] as applied to claim 15 above, in further view of Gotkis et al [US 2004/0058620].

Hsu et al in view of Misra et al substantially discloses the claimed method except teaching the semiconductor substrate is reported as an abnormally polished wafer by a CMP machine at a predetermined CMP endpoint after performing said first CMP process to remove said part of said conductive layer.

However, Gotkis et al (fig 4, text [0001]-[0095]) discloses using the CMP machine for checking and reporting the semiconductor substrate if the semiconductor substrate is the abnormally polished wafer at the predetermined CMP endpoint after performing a CMP process to remove the part of the conductive layer and subjecting the abnormally polished wafer to rework process.

Therefore, at the time of invention, it would have been obvious for those skilled in the art to modify the process of Hsu et al in view of Misra et al by using the CMP machine for reporting the semiconductor wafer as being claimed, per taught by Gotkis et al, to provide a better controlled and convenient CMP rework process with increased

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efficiency such as time saving of handling processed wafer (see Gotkis et al, text [0023] and [0042] specifically).

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Thanhha Pham
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Patent Examining Group 2800